polyesters demonstrate improved compatibility with pentane, and Magnus teaches a phthalic-based polyester polyol blend that incorporates fluorocarbon blowing agents, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the fluorocarbon blowing agents disclosed in Magnus with pentane to arrive at the present invention. Applicant submits that that Magnus in view of van der Wouden (Utech 94) does not suggest to an ordinary skilled artisan a reasonable expectation of success in making the compositions of the instant claims. Withdrawal of the 35 U.S.C. 103(a) rejection is therefore respectfully requested.

Van der Wouden (Utech 94) teaches that low polarity polyols are needed for hydrocarbon compatibility. Applicant's response dated October 10, 1998 argued that the polyols of Magnus would have higher polarities and thus would not be expected to demonstrate hydrocarbon compatibility. The Office Action dated November 13, 1998 concluded that the hydrophobic component of Magnus would lower the polarity sufficiently to enable compatibility with the hydrocarbon blowing agent.

The teachings of van der Wouden (Utech 94) and Magnus would not render the present invention obvious to a person of ordinary skill in the art. In reviewing obviousness rejections, the Federal Circuit has stated that where claimed subject matter is rejected as obvious in view of a combination of references, "a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success." In re Vaeck, 947 F.2d 488, 493, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991). The Federal Circuit emphasized that "[b]oth the suggestion and the reasonable expectation of success must be found in the prior art, not in the applicant's disclosure." Id. Contrary to the Examiner's position, Magnus in view of van der Wouden (Utech 94) does not suggest a reasonable expectation of success in making the composition of the instant claims.

As the declaration of F. Leo Hickey dated February 15, 1999 ("the Hickey declaration") states, van der Wouden (Utech 94) investigated the effects of adding three types of dimer acid-based polyester polyols to a hydrocarbon-incompatible polyether polyol. At constant polyether/polyester

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ratio, hydrocarbon compatibility increased as polyester polyol polarity decreased. Van der Wouden (Utech 94) identified the polyester polyol enabling best hydrocarbon solubility as dimer acid-based "Unichema polyester OHV 345," sold under the tradename Priplast 3185. *See* van der Wouden (Utech 94) page 2, column 1, line 52; van der Wouden, "Performance of Oleochemical Based Polyester Polyols in Polyurethanes," Utech Asia '95, Paper 34 ("van der Wouden (Utech Asia 95)"), page 2, column 1, line 54. And van der Wouden (Utech Asia 95) asserts that Priplast 3181 polyester polyol has hydrocarbon compatibility even better than that of Priplast 3185.

As the Hickey declaration states, one of ordinary skill in the art can estimate the dimer acid content of a given polyester polyol using various methods. Such estimations are possible here based on statements in van der Wouden (Utech 94) and van der Wouden (Utech Asia 95) that make it reasonable for one familiar with polyester polyols to assume Priplast 3181 and Priplast 3185 are reaction products of dimer acid and glycerol.

One method of estimating dimer acid content is by examining the relative densities of the reactants and the product. As the Hickey declaration demonstrates in detail, using this method, the estimated dimer acid content of the Priplast 3185 of van der Wouden (Utech 94) is 68% dimer acid. A similar calculation shows that the estimated dimer acid content of the Priplast 3181 of van der Wouden (Utech Asia 95) is 61% dimer acid.

An alternative method for estimating dimer acid content involves examining both the stoichiometry of the reaction that produces the polyol and the hydroxyl value of the reaction product polyol. As the Hickey declaration demonstrates in detail, using this method, the estimated dimer acid content of the Priplast 3185 of van der Wouden (Utech 94) is 74% dimer acid. A similar calculation shows that the estimated dimer acid content of the Priplast 3181 of van der Wouden (Utech Asia 95) is 69% dimer acid.

Both estimation methods suggest that the content of hydrophobic component required for enabling hydrocarbon compatibility is well over 50 percent by weight. Thus, after considering van der Wouden (Utech 94), and assuming the combination of van der Wouden (Utech 94) and Magnus is proper, an ordinary skilled artisan would expect that the amount of a hydrophobic material, such as soybean oil, required to produce hydrocarbon

compatibility in an otherwise polar phthalic anhydride-based polyol, like those of Magnus, is also likely to be well over 50 percent by weight.

However, a minimum of two functional groups per molecule is necessary in polyurethane-forming reactions. Thus, as the Hickey declaration states, one skilled in the art would be concerned that reacting over 50 percent by weight monofunctional hydrophobic material into a difunctional phthalic-based polyol like that of Magnus would severely reduce the difunctionality of the resulting polyester polyol, and thereby cause widespread chain termination and degrade foam properties. A representative calculation disclosed in the Hickey declaration based on 50 percent by weight soybean oil and 50 percent by weight of a particular phthalic anhydride-based polyol shows that the final functionality of such a reaction product would be 1.43. Because the final functionality is much less than 2, a person skilled in the art of polyurethane polyols would expect this approach to be unworkable.

In view of the fact that the above analysis, which is based on information available at the time of the invention and indicates that the van der Wouden (Utech 94) approach requires excessively high levels of reacted hydrophobic materials, it is surprising to find that much lower levels of these materials (in combination with surfactants) are effective in compatibilizing high percentages of hydrocarbons. The ability of the claimed invention to use lower levels of monofunctional hydrophobic residues avoids the problem of excessively reducing functionality and the expected possibility of resulting inferior polymer properties.

Van der Wouden (Utech 94) teaches that well over 50 percent by weight hydrophobic component is required for enabling hydrocarbon compatibility. Magnus is silent on the issue of hydrocarbon compatibility, and teaches only that incorporating up to 28 mole percent of hydrophobic component into a polyester polyol enables fluorocarbon compatibility. *See* Magnus, at col. 6, line 31. The most preferred range of hydrophobic compound in Magnus is 5 to 15 mole percent. *See* Magnus, at col. 7, line 37. Magnus examples show hydrophobic component being utilized at levels of about 20 percent by weight. *See* Magnus, at Table X, col. 22, Example 16 (decyl alcohol used at 19.1 wt%); col. 21, Example 9 (soybean oil used at 20.6 wt%). The present invention enables hydrocarbon

compatibility even though it incorporates less than about 40 percent by weight hydrophobic component. An ordinary skilled artisan considering Magnus in view of van der Wouden (Utech 94) would not expect that incorporating only about 40 percent by weight or less of hydrophobic component would sufficiently lower the polarity of the polyester polyol to enable compatibility with a hydrocarbon blowing agent.

For at least the above reasons, Applicant respectfully submits that van der Wouden (Utech 94) and Magnus are not an effective combination to reject claims 1-15 for obviousness under § 103(a). Withdrawal of the § 103 rejection is in order and is respectfully requested.

Consideration and entry of this amendment and reconsideration of this application is respectfully requested and a favorable determination is earnestly solicited. Should the Examiner believe that a discussion of this matter would be helpful, the Examiner is invited to telephone the undersigned at (312) 913-0001.

Respectfully submitted,

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